Drinking Water Quality Management Report

Financial Year 2019

BRISBANE AIRPORT

SPID 00545

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Document Title: **FY 19, Brisbane Airport Drinking Water Quality Management Report**

Document Location: BAC M/Water/DWQMP/Reports/FY19 Brisbane Airport Water Quality Management report

Version: 3.0

Issue Date: **December 2019**

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Contents

Glossary of terms

ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
E. coli	*Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
HACCP	Hazard Analysis and Critical Control Points certification for protecting drinking water quality
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
MPN/100mL	Most probable number per 100 millilitres
CFU/100mL	Colony forming units per 100 millilitres
<	Less than
>	Greater than

1. Introduction

This report documents the performance of Brisbane Airport 's drinking water service with respect to water quality and performance in implementing the actions detailed in the drinking water quality management plan (DWQMP) as required under the Water Supply (Safety and Reliability) Act 2008 (the Act).

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

This report has been prepared for the period July 2018 to June 2019.

2. Overview of Operations

Service Provider Name – Brisbane Airport Corporation Limited

Service Provider identification Number (SPID) – 545

Brisbane Airport Corporation (BAC) receives potable water supply from Queensland Urban Utilities (QUU) water system, which is an external service provider. The supply chain is as follows:

a. Seqwater provides water treatment to produce and store potable water at a series of locations around the South-east Queensland area

b. Water is transported via Seqwater owned bulk water transport infrastructure into QUU owned infrastructure

c. QUU (local water distributor) purchases water from Seqwater (formally the SEQ Water Grid manager)

d. BAC purchases water from QUU, which is received from the Wellers Hill supply scheme via a twin DN300 connection at Sugarmill Road.

BAC owns and operates the trunk services on-airport for potable water and plans for, designs, constructs and maintains these services. Works on these services cannot proceed without approval from BAC. All water reticulation services are designed to achieve BAC's levels of service. All water utilities are designed and installed to Australian Standards and all environmental and Airport Building Controller requirements.

3. Actions taken to implement the DWQMP

3.1. DWQMP approval conditions

On 19 March 2019 BAC submitted the updated DWQMP to the Department of Natural Resources, Mines and Energy (DNRME).

An information notice was received from DNRME 18 April 2019 to approve (with conditions) the amended DWQMP.

BAC can confirm that it complies with the DWQMP approval conditions.

3.2. Risk management improvement program.

The current approved DWQMP risk management approach was different to previous versions. All risks to the BAC water service were assessed by the risk assessment team as acceptable. For this reason, there is no risk management improvement plan in the current BAC DWQMP or this report. See Appendix B for the identified unmitigated and mitigated risks.

3.3. Amendments made to the DWQMP

On 19 March 2019 BAC submitted the updated DWQMP to the Department of Natural Resources, Mines and Energy (DNRME). There were no other amendments during the reporting period.

4. Compliance with water quality criteria for drinking water

Routine sampling is conducted under contract by QUU SAS Laboratory which is NATA accredited.

Please refer to Appendices A Table 1 -'Summary of water quality criteria compliance' and Table 2: Reticulation E. coli verification monitoring. All results have met with the recommended values in the Australian Drinking Water Guidelines including standards in the Public Health Regulations 2005.

5. Notifications to the Regulator under sections 102 and 102A of the Act

This financial year there was one instance where the Regulator was notified under sections 102 or 102A of the Act.

5.1. Non-compliance with the water quality criteria.

Compliance with 98% annual value was achieved for this reporting period.

5.2. Prescribed incidents or Events reported to the Regulator

Incident Description:
As part of our annual review of water quality testing results, in January 2019 we identified an E.coli exceedance (1 cfu/100mL) on a sample taken on the 4th of September 2018. The sample was collected from a hose outside of the International Terminal Building, a non-defined monitoring sampling point of the DWQMP. This E. coli exceedance was not identified during subsequent water testing of the same location on the 9th October 2018, 6th November 2018 and 9th January 2019. Each of the subsequent tests returned results of <1cfu/100mL for each occasion. This was reported to the Regulator by phone and follow up email (23/01/2019).

DWI-545-19-08192
On the 14th March 2019 a positive test result was returned at SAS laboratory during routine water quality testing. The laboratory contacted the relevant BAC hydraulics coordinator of the positive result by phone and email. A retest was undertaken which was negative and the local hydraulic network where the positive result occurred was flushed as per the BAC Drinking Water Quality Management Plan (DWQMP) - Incident Response Plan. This was reported to the Regulator by phone and follow up WSR503 Part A and Part B (05/12/2019).

6. Customer complaints related to water quality

Brisbane Airport is required to report on the number of complaints, general details of complaints, and the responses undertaken.
No complaints were received from customers in relation to water quality during this reporting period.

7. Outcome of the review of the DWQMP and how issues raised have been addressed

The next internal review of the DWQMP is due before 5 June 2021.

Historically there have been low residual chlorine levels recorded at most locations throughout the BAC network. The levels recorded at the QUU intake on Sugarmill Road are also traditionally low although during the winter months there is generally some residual chlorine recorded.

BAC has actively engaged with QUU to find solutions to increase the residual chlorine levels at the intake. BAC continues to use a specialist contractor to scour the mains to remove any potential biofilm from the internal walls of the pipework.

This along with higher chlorine levels in the QUU supply has provided a change in the total chlorine levels across the network and this can be seen in the chart included. Levels recorded at the Sugarmill Rd intakes have increased slightly and are present all year and levels have been detected at various locations and the two Terminals are included in the chart.

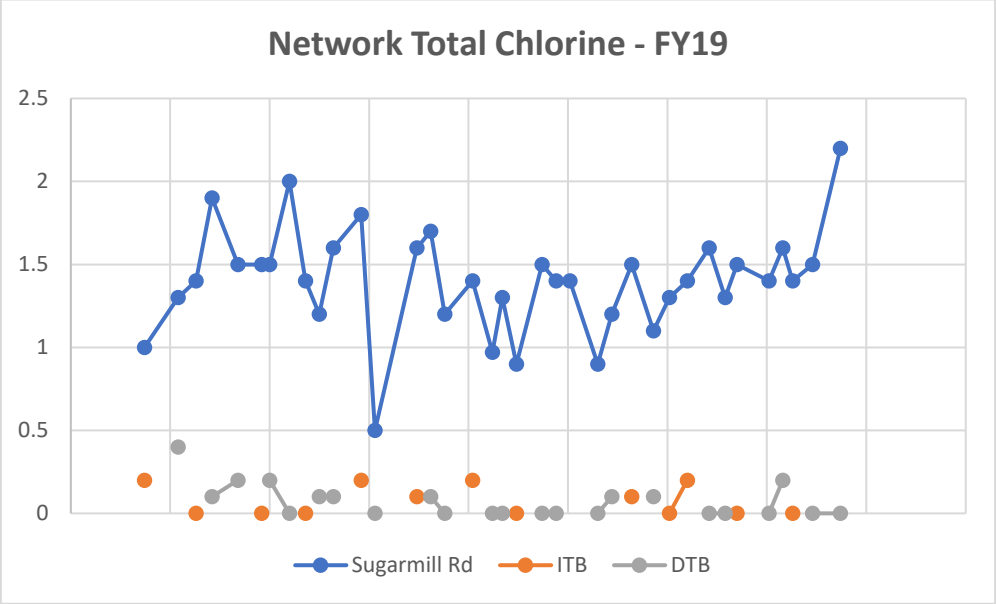

Chart 1 – BAC Network Chlorine FY19

BAC and QUU have progressed the installation of a Chloramine dosing plant. This project is now due to be completed and the plant operational by the end of 2020.

7.1. New Hazards identified

There have been no new hazards identified during the reporting period.

8. Appendix A – Summary of compliance with water quality criteria

Test Parameter	Unit of Measurement	Total No of samples collected	Max Concentration / Count	Exceedance Count*
Free Chlorine by Photometer	mg/L	181	0.42	0
Total Chlorine by Photometer	mg/L	180	2.2	0
Temperature - Field	° C	177	31.2	0
Coliforms (Colilert)	MPN/100mL	184	46	0
E. coli (Colilert)	MPN/100mL	184	1	1
HPC	cfu/mL	96	1200	0
pH	pH Unit	105	8.2	0
Ammonia N	mg/L	106	0.50	0
Nitrite N by FIA	mg/L	106	0.25	0
Nitrite+Nitrate as N	mg/L	106	0.65	0
Nitrate N by FIA (Calc)	mg/L	106	0.65	0
Monochloroacetic Acid	ug/L	106	<10	0
Dichloroacetic Acid	ug/L	106	12	0
Trichloroacetic Acid	ug/L	106	<10	0
Bromochloroacetic Acid	ug/L	106	14	0
Monobromoacetic Acid	ug/L	106	<10	0
Dibromoacetic Acid	ug/L	106	11	0
Total Haloacetic Acids	µg/L	106	<60	0
Chloroform	µg/L	106	24	0
Bromodichloromethane	µg/L	106	30	0
Chlorodibromomethane	µg/L	106	34	0
Bromoform	µg/L	106	11	0
THMs Total	µg/L	106	94	0
Fluoride	mg/L	36	0.75	0
Aluminium ICPMS	mg/L	36	0.12	0
Copper ICPMS	mg/L	36	0.89	0
Iron ICPMS	mg/L	36	0.11	0
Manganese ICPMS	mg/L	36	0.01	0
Lead ICPMS	mg/L	36	0.009	0
Zinc ICPMS	mg/L	36	0.22	0
C6-C9 Fraction	ug/L	9	<10	0
C10-C14 Fraction	ug/L	9	<50	0
C15-C28 Fraction	ug/L	9	<50	0
C29-C36 Fraction	ug/L	9	<50	0
Benzene	ug/L	9	<1	0
Toluene	ug/L	9	<2	0
Ethyl Benzene	ug/L	9	<1	0
meta & para-Xylene	ug/L	9	<2	0
ortho-Xylene	ug/L	9	<1	0
1.2.4-Trimethylbenzene	ug/L	9	<1	0
1.3.5-Trimethylbenzene	ug/L	9	<1	0
* Exceedence count = number of samples that did not meet the water quality criteria.				

TABLE 1 Summary of water quality criteria compliance

Year	2018						2019					
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	16	14	14	16	15	15	17	15	16	17	15	14
No. of samples collected in which *E coli* is detected	0	0	0	0	0	0	0	0	1	0	0	0
No. of samples collected in previous 12 month period	186	185	182	183	181	181	180	182	183	185	184	184
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	1	1	1	1
% of samples that comply	100	100	100	100	100	100	100	100	99	99	99	99
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 2 - Reticulation E. coli verification monitoring

Appendix B – DWQMP Risk Management

Table 3 Unmitigated Risk Assessment

Hazard Category	Primary Hazard	Source/ Hazardous event	Risk rating			Uncertainty	COMMENTS
			Consequence	Likelihood	Rating		
Physical	Manganese (aesthetic)	High Fe, Mn or turbidity levels in upstream water supply resulting in aesthetically unpleasing water.	Minor	Rare	Low 2	Confident	
Physical	Manganese (health)	High Mn concentration (in excess of the health guidelines) from upstream water supply exceeding health guideline	Moderate	Rare	Low 3	Certain	
Microbial	Protozoa	Protozoan contamination from upstream water supply. Or, recontamination from mains breaks, reservoir ingress or backflow. Recycled water cross connection	Catastrophic	Rare	Medium 6	Confident	Boiling water not feasible,
Microbial	Bacteria	Bacterial contamination from upstream water supply. Or recontamination from mains breaks, reservoir ingress or backflow. Recycled water cross connection	Catastrophic	Rare	Medium 6	Certain	Disinfection from Seqwater, and redosed by Seqwater
Microbial	Viruses	Ineffective treatment by upstream provider. Or recontamination from mains breaks, reservoir ingress or backflow. Recycled water cross connection	Catastrophic	Rare	Medium 6	Reliable	Disinfection from Seqwater, and redosed by Seqwater
Microbial	Opportunistic Pathogens	*Legionella/ Naeglaria/ Acanthamoeba/ Mycobacteria* establishment in reticulation due to long residence time and loss of residual	Major	Rare	Medium 5	Confident	Chloramine residual is >0.5 mg/L at the infeed but is ultimately lost within the BAC network.
Chemical	MIB/ Geosmin	Algal blooms in catchment resulting in taste or odour	Moderate	Possible	Medium 9	Reliable	Minimal complaints at BAC
Chemical	Algal Toxins	Toxins in raw water supply not removed by treatment	Moderate	Rare	Low 3		
Chemical	TDS	High TDS from raw water causing scaling issues	Minor	Possible	Medium 6		
Chemical	Heavy metals	Ineffective treatment by upstream provider. Leaching of Fe/Mn/Pb from aged assets.	Minor	Unlikely	Low 4		
Chemical	Taste and Odour - chloramines	Incorrect ratio of chlorine to ammonia from upstream treatment resulting poor taste, odour	Minor	Rare	Low 2		
Chemical	Chlorate	High chlorate concentrations resulting from upstream chlorination and re-chlorination	Minor	Rare	Low 2		Chlorate has WHO health guideline but no ADWG guideline.
Chemical	Total Chlorine	Upstream chlorine/ chloramine overdose	Moderate	Rare	Low 3	Certain	Chlorine slightly above guideline is unlikely to cause any health effect but can encourage customers to use a less safe source.
Chemical	Fluoride	Fluoride overdose	Moderate	Rare	Low 3		SeqWater has CCPs for Fluoride, and interlocks to prevent overdose. Historically never impacted BAC.
Chemical	Disinfection Byproducts - HAAs and THMs	Chlorine disinfection by-products exceed health guideline value.	Minor	Rare	Low 2		Upstream providers manage effectively.

Chemical	Pesticides	Pesticides not removed by water treatment.	Minor	Rare	Low 2		
Radiological	Radiological	Radiological compounds not removed by water treatment.	Minor	Rare	Low 2	Estimate	Seqwater testing
Supply	Supply - Loss of Supply	Drought, treatment plant failure, asset failure resulting in complete loss of water supply	Catastrophic	Rare	Medium 6	Confident	Listed as high criticality risk in BAC asset management plan
Supply	Supply - Insufficient Pressure	Failure in upstream water distribution system resulting in lost pressure	Moderate	Rare	Low 3	Confident	
Physical	Turbidity	Disturbance of sediment and entrainment into potable water supply, causing visible turbidity.	Minor	Unlikely	Low 4	Confident	
Microbial	Contamination - sabotage	Terrorism event, unauthorised intentional contamination causing microbial contaminant to enter potable network	Catastrophic	Rare	Medium 6	Reliable	
Microbial	Contamination - unintentional	Poor work practices leading to contamination during maintenance or construction activities	Catastrophic	Unlikely	High 10	Reliable	
Chemical	Hydrocarbons	Organic chemicals leaching into plastic pipes	Moderate	Possible	Medium 9	Reliable	
Chemical	Chemical recontamination	Pipe burst resulting in chemicals (pesticides, heavy metals) flowing into water distribution network, backflow from non-potable cross connection	Minor	Unlikely	Low 4	Confident	
Chemical	PFAS	Firefighting foams historically used at Airport - contaminated groundwater infiltrating water network	Moderate	Rare	Low 3	Confident	System integrity should exclude these chemicals
Whole of System	Lack of Staff Knowledge	O&M procedures not properly documented	Major	Possible	High 12	Estimate	
Whole of System	Operations error	Lack of Staff and Contractor training leading to hazard	Major	Possible	High 12	Estimate	
Whole of System	Loss of Knowledge	Lack of staff retention leading to loss of knowledge	Major	Possible	High 12	Estimate	
Cyber Security	Cyber attack	Cyber attack targeting control systems	Minor	Rare	Low 2	Confident	Manual valves, SCADA for pressure and flow monitoring not control
Cyber Security	Loss of control systems	Failure of SCADA systems	Minor	Rare	Low 2	Confident	Manual valves, SCADA for pressure and flow monitoring not control

Table 4 Mitigated Risk Register

Area	Primary hazard	Other hazards managed by same barriers	Hazardous Event	Maximum Risk	Existing Preventive Measure	Residual Risk				Documented Procedure	RMIP			Comments
				Risk Level		Consequence	Likelihood	Risk Level	Uncertainty		Immediate	Short Term	Long Term	
BAC Infeed	Protozoa		Protozoan contamination from upstream water supply/ ingress into QUU network through reservoirs/ mains breaks/ backflow	Medium 6	Reliance on Seqwater to appropriately treat water, and for QUU to manage distribution network to prevent ingress. Watermain repair and construction procedures (under contract to QUU), including testing. Incident response including communication BAC/QUU/customers	Catastrophic	Rare	Medium 6	Confident					
BAC Distribution Network	Protozoa		Recontamination from BAC mains breaks or backflow.	Medium 6	Watermain repair and construction procedures. Incident response including communication BAC/QUU/customers Emergency response plan initiated QUU/BAC communications forum	Catastrophic	Rare	Medium 6	Confident					
BAC Infeed	Bacteria	Viruses	Bacterial/Viral contamination from upstream water supply/ ingress into QUU network through reservoirs/ mains breaks/ backflow	Medium 6	Reliance on Seqwater to appropriately treat water, and for QUU to manage distribution network to prevent ingress. Watermain repair and construction procedures (under contract to QUU), including testing. Residual disinfection maintained by QUU. Incident response including communication BAC/QUU/customers	Catastrophic	Rare	Medium 6	Confident					
BAC Distribution Network	Bacteria	Viruses. Opportunistic pathogens	Recontamination from BAC mains breaks or backflow.	Medium 6	Residual Disinfection, Documented mains repair procedures. Backflow prevention devices and register, Incident response including communication BAC/QUU/customers Emergency response plan initiated QUU/BAC communications forum	Catastrophic	Rare	Medium 6	Confident					
BAC Distribution Network	Bacteria	Viruses. Opportunistic pathogens	Cross connection to recycled water	Medium 6	Different pipe sizes Pressure differential Different coloured pipes Trained operator works on systems Accurate as-cons	Catastrophic	Rare	Medium 6	Confident					
BAC Distribution Network	Protozoa		Cross connection to recycled water	Medium 6	Different pipe sizes Pressure differential Different coloured pipes Trained operator works on systems Accurate as-cons	Catastrophic	Rare	Medium 6	Confident					
BAC Distribution Network	Opportunistic Pathogens		Regrowth in BAC distribution network	Medium 5	Residual disinfection Backflow prevention Backflow device maintenance procedures Routine and abhor flushing of areas in International Terminal/Outer buildings Removal of dead ends at International	Major	Rare	Medium 5	Confident					Considered unlikely to be in source water given that residual disinfection to BAC is > 0.5 mg/L chloramine.

					Terminal complete Mains flushing									
BAC Infeed	MIB/ Geosmin	Other organic compounds	Breakthrough of treatment processes	Medium 9	Reliance on Seqwater to appropriately treat water. Communication between BAC/QUU/customers.	Moderate	Possible	Medium 9	Confident					
BAC Infeed	Supply - Loss of Supply		Single point of failure in infeed	Medium 6	Incident response including communication between BAC/QUU/customers	Catastrophic	Rare	Medium 6						BAC and QUU to consider sharing pressure signals
BAC Infeed	TDS		Source water has high TDS/ increasing with chlorination (if sodium hypochlorite)	Medium 6		Minor	Possible	Medium 6	Confident					
BAC Distribution Network	Contamination - sabotage		Terrorism event, unauthorised intentional contamination causing microbial contaminant to enter potable network	Medium 6	Backflow prevention Security checks Pressurised system	Catastrophic	Rare	Medium 6	Confident					
BAC Distribution Network	Contamination - unintentional		Poor work practices leading to contamination during maintenance or construction activities	High 10	Watermain repair and construction procedures, including testing. Standard construction practices including flushing and disinfection procedures. BAC has adopted SEQ Code D&C procedures, including testing and disinfection procedures for new mains connections	Catastrophic	Rare	Medium 6	Reliable					
BAC Distribution Network	Hydrocarbons		Pipes can be pervious to hydrocarbons	Medium 9	Australian Standards for materials, survey has identified separation from fuel areas to trunk mains	Moderate	Rare	Low 3	Reliable					
Staff Capability and Awareness	Lack of Staff Knowledge		O&M procedures not properly documented	High 12	Documented and agreed/formalised procedures	Major	Unlikely	Medium 8	Confident					
Staff Capability and Awareness	Operations error		Lack of Staff and Contractor training leading to hazard	High 12	Training - sampling, back flow prevention all O&M procedures Operator qualifications. Awareness of water quality issues Reporting/communication with hydraulics team	Major	Unlikely	Medium 8	Confident					
Staff Capability and Awareness	Loss of Knowledge		Lack of staff retention leading to loss of knowledge	High 12	Low staff turnover, record keeping-central maintenance management system, training of new staff	Major	Unlikely	Medium 8	Reliable					